

Small Self-Regulating Fission Reactor System

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A power system for special government applications

BACKGROUND & MOTIVATION

For Space: Primary source of power for NASA missions (Pu_{238}) is in limited supply and production of new material may not cover future missions.



For DoD: Delivering fuel to remote military bases is costly and risky. Fuel convoys are often attacked and results in



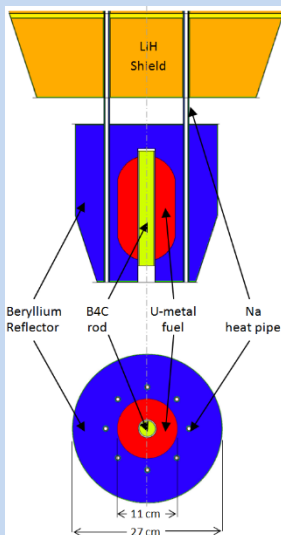
casualties. A low cost, long lasting power solution, that does not require refueling is needed.

INNOVATION

A small self-regulating fission reactor made with U_{235} .

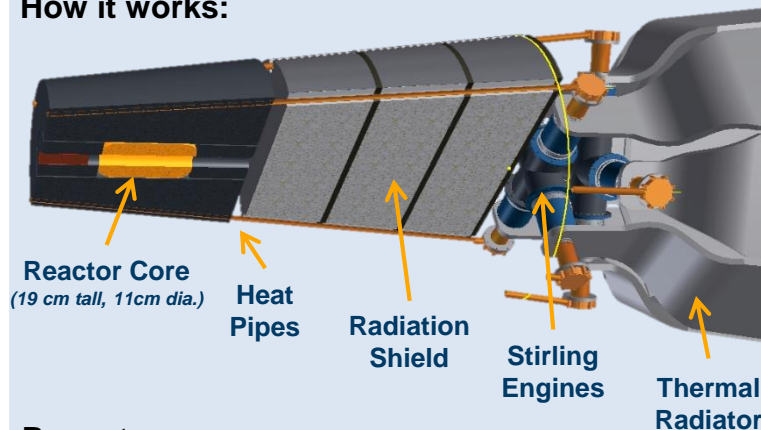
Why U_{235} ?

U_{235} is plentiful and could mitigate the shortfall in Pu_{238} and increase the ability of future missions.



DESCRIPTION

How it works:



Recent progress:

LANL and NASA continue to mature the design and are preparing for the development of a prototype unit. Materials chosen for the design will be well characterized and abundant.

LANL and NASA with the support of NSTec performed a proof of concept test at the Nevada Test Site.



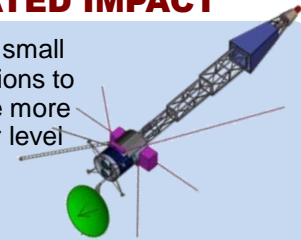
Test apparatus – Nuclear material on left and power conversion on right

Technology Readiness Level (TRL) 5

- Reactor core is ready for demonstration.
- Power conversion system ready for deployment.

ANTICIPATED IMPACT

For Space: With a small fission system, missions to the outer planets are more likely and at a power level much higher than previously believed.



For mobile platforms, including DoD: Small self-regulating fission reactors can also be built for ground and mobile platforms, delivering safe, reliable, extremely long lasting power solutions.



PATH FORWARD

1st – Start with space applications:

- LANL and NASA Glenn Research have begun development of the reactor concept. NASA management has decided to make small fission its No. 1 priority for nuclear energy investment going forward.

2nd – Identify DoD first adopters

- Find DoD customers who can help fund development of a first prototype for mobile land and underwater applications.

Potential End Users:

- NASA, DoD, Energy Companies

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